Amendments to the Claims

This listing of claims will replace the originally filed claims in the application.

Listing of Claims:

Claims 1 – 26 (cancelled).

Claim 27 (new): A method which may be used for producing a synthesis gas containing hydrogen and carbon monoxide, said method comprising:

a) pre-reforming a hydrocarbon mixture to obtain a first mixture;

b) reforming said first mixture with an oxidizing mixture to obtain a raw synthesis gas, wherein:

1) said oxidizing mixture comprises oxygen and is heated, prior to said reforming, to a temperature between about 871° C and about 1300° C;

2) said raw synthesis gas comprises:

i) hydrogen;

ii) carbon monoxide;

iii) carbon dioxide;

iv) water; and

v) an oxygen-depleted mixture; and

3) said reforming is performed in a catalytic ceramic membrane reactor (RCMC); and

c) preheating the various streams used.

Claim 28 (new): The method of claim 27, wherein said oxidizing mixture is heated, prior to said reforming, to a temperature of about 1000° C.

Claim 29 (new): The method of claim 27, wherein said first mixture is brought to a temperature, prior to said reforming, at least about 111° C lower than said temperature of said oxidizing mixture.

Claim 30 (new): The method of 27, further comprising desulfurizing said hydrocarbon mixture prior to said pre-reforming.

Claim 31 (new): The method of claim 30, wherein said hydrocarbon mixture is desulfurized at a temperature between about 250° C and about 450° C.

Claim 32 (new): The method of claim 31, further comprising adding hydrogen to said hydrocarbon mixture prior to said desulfurization.

Claim 33 (new): The method of claim 31, wherein said temperature of said hydrocarbon mixture is about 400° C.

Claim 34 (new): The method of claim 27, wherein said pre-reforming is preformed in a catalytic reactor at a temperature between about 450° C and about 550° C;

Claim 35 (new): The method of claim 34, wherein catalytic reactor is an adiabatic type catalytic reactor.

Claim 36 (new): The method of 34, wherein said hydrocarbon mixture is preheated, prior to said pre-reforming, to a temperature of about 500° C.

Claim 37 (new): The method of claim 27, wherein the temperature of said oxygen-depleted mixture is lower than said temperature of said oxidizing mixture.

Claim 38 (new): The method of claim 37, wherein the difference between said temperature of said oxygen-depleted mixture and said temperature of said oxidizing mixture is at least about 75° C.

Claim 39 (new): The method of claim 27, wherein the temperature of said first mixture is between about 550° C and about 670° C.

Claim 40 (new): The method of claim 39, wherein said temperature of said first mixture is about 650° C.

Claim 41 (new): The method of claim 27, wherein:

a) said raw synthesis gas is at a temperature between about 800° C and about 1100° C; and

b) the temperature of said oxygen-depleted mixture is lower than said temperature of said synthesis gas.

Claim 42 (new): The method of claim 27, further comprising:

a) cooling said raw synthesis gas; and

b) separating said raw synthesis gas.

Claim 43 (new): The method of claim 42, further comprising purifying said raw synthesis gas.

Claim 44 (new): The method of claim 42, further comprising treating said raw synthesis gas.

Claim 45 (new): The method of claim 27, wherein:

a) said oxidizing mixture is obtained through the treatment of a first oxygenated gas mixture; and

b) said first oxygenated gas mixture comprises between about 10 molar % and about 50 molar % of oxygen.

Claim 46 (new): The method of claim 45, wherein:

a) said preheating said various streams comprises preheating with at least one preheating furnace;

b) said preheating furnace uses heat contained in said oxygen-depleted mixture; and

c) said preheating furnace comprises at least one post-combustion chamber.

Claim 47 (new): The method of claim 46, wherein:

a) said oxidizing mixture is obtained by an oxidizing mixture production method; and

b) said production method comprises at least one member selected from the group consisting of:

1) preheating said first oxygenated gas by heat exchange with said oxygen-depleted mixture in said preheating furnace; and

2) directly combusting a primary heating gas with said first oxygenated gas in at least one combustion chamber.

Claim 48 (new): The method of claim 47, wherein:

a) said first oxygenated gas is at least part of a combustion gas from an outlet of a gas turbine;

b) said combustion gas has a pressure less than about 2×10^5 Pa abs; and

c) said combustion gas has a temperature between about 500° C and about 600° C.

Claim 49 (new): The method of claim 47, wherein:

a) said oxidizing mixture is at least part of a combustion gas from an outlet of combustion chamber associated with a gas turbine;

b) said combustion gas has a pressure between about 20 x 10^5 Pa abs and about 50 x 10^5 Pa abs; and

c) said combustion gas has a temperature between about 1100° C and about 300° C.

Claim 50 (new): The method of claim 49, further comprising supplying said oxygen-depleted mixture to said gas turbine for the cogeneration of electrical energy.

Claim 51 (new): The method of claim 50, further comprising supplying an oxygen-depleted mixture from an outlet of said turbine to said preheating furnace.

Claim 52 (new): The method of claim 49, wherein the pressure of said first mixture differs from the pressure of said oxidizing mixture by less than about 10%.

Claim 53 (new): The method of claim 47, wherein:

a) said oxidizing mixture comprises at least part of a first combustion gas;

b) said first combustion gas is supplied from an outlet of a first combustion chamber; and

c) said first combustion chamber is supplied with:

1) a first fraction of a combustible fluid; and

2) an oxygenated gas.

Claim 54 (new): The method of claim 53, wherein said first combustion chamber is supplied with combustion air from an outlet of an air compressor turbine.

Claim 55 (new): The method of claim 53, wherein:

a) said oxidizing mixture has a pressure between about 20 x 10^5 Pa abs and about 50 x 10^5 Pa abs; and

b) said oxidizing mixture has a temperature between about 871° C and about 1100° C.

Claim 56 (new): The method of claim 55, wherein the pressure of said first mixture differs from the pressure of said oxidizing mixture by less than about 10%.

Claim 57 (new): The method of claim 53, further comprising:

a) mixing said oxygen-depleted mixture with at least part of said first combustion gas to create a second oxygenated feed gas; and

b) supplying said second oxygenated feed gas to a second combustion chamber, wherein said second combustion chamber is also supplied with a econd fraction of a combustible fluid.

Claim 58 (new): The method of claim 57, wherein:

a) a second combustion gas is available from an outlet of said second combustion chamber;

b) said second combustion gas is at a pressure between about 20×10^5 Pa abs and about 50×10^5 Pa abs;

c) said second combustion gas is at a temperature between about 1100° C and about 1300° C; and

d) said temperature of said second combustion gas is independent of the operating temperature of said RCMC.

Claim 59 (new): The method of claim 58, further comprising generating electricity by expanding said second combustion gas in a gas turbine.

Claim 60 (new): The method of claim 59, wherein a combustion gas from an outlet of said gas turbine is supplied to said preheating furnace.

Claim 61 (new): The method of claim 47, wherein:

a) said first oxygenated gas is at least part of a waste gas from an air separation unit;

b) said first oxygenated gas comprises about 25 molar % to about 40 molar % of oxygen;

c) said first oxygenated gas is at a pressure of at least about 1.6×10^5 Pa abs; and

d) said first oxygenated gas is substantially at ambient temperature.